

CLAIMS:

What is claimed is:

1. A method in a data processing system for providing valid translation entries in a translation control entry table for all supported direct memory addresses, comprising:

reserving a page in system memory;

writing the reserved page;

selecting a region in system memory for the translation control entry table; and

initializing all entries in the translation control entry table, wherein all entries are initialized to be valid and contain the address of the reserved page.

2. The method of claim 1, further comprising:

updating an entry in the translation control entry table, wherein a physical memory page replaces the reserved page when the entry is used by an operating system's device driver.

3. The method of claim 2, further comprising:

restoring the entry in the translation control entry table with the reserved page when the entry is no longer used by an operating system.

4. The method of claim 2, further comprising:

determining whether a direct memory address translation corresponding to the entry has been cached in a translation lookaside buffer; and

responsive to a determination that such a direct memory address translation exists, clearing the direct memory address translation from the translation lookaside buffer.

5. The method of claim 1, wherein the page system memory is inaccessible to an operating system running on the data processing system.

6. The method of claim 1, wherein writing the reserved page includes setting all bytes within the reserved page to 0xFF.

7. The method of claim 1, wherein initializing all entries to be valid includes setting all valid bits to "1".

8. The method of claim 1, wherein the reserved page is a 4KB page.

9. The method of claim 1, wherein the translation control entry table comprises a 2MB TCE table having 512K 4-byte entries.

10. A data processing system for providing valid translation entries in a translation control entry table for all supported direct memory addresses, comprising:

reserving means for reserving a page in system memory;

writing means for writing the reserved page;

selecting means for selecting a region in system memory for the translation control entry table; and

initializing means for initializing all entries in the translation control entry table, wherein all entries are initialized to be valid and contain the address of the reserved page.

11. The data processing system of claim 10, further comprising:

updating means for updating an entry in the translation control entry table, wherein a physical memory page replaces the reserved page when the entry is used by an operating system's device driver.

12. The data processing system of claim 11, further comprising:

restoring means for restoring the entry in the translation control entry table with the reserved page when the entry is no longer used by an operating system.

13. The data processing system of claim 11, further comprising:

determining means for determining whether a direct memory address translation corresponding to the entry has been cached in a translation lookaside buffer; and

clearing means for clearing the direct memory address translation from the translation lookaside buffer

in response to a determination that such a direct memory address translation exists.

14. The data processing system of claim 10, wherein the reserved page is inaccessible to an operating system running on the data processing system.

15. The data processing system of claim 10, wherein writing the reserved page includes setting all bytes within the reserved page to 0xFF.

16. The data processing system of claim 10, wherein initializing all entries to be valid includes setting all valid bits to "1".

17. The data processing system of claim 10, wherein the reserved page is a 4KB page.

18. The data processing system of claim 10, wherein the translation control entry table comprises a 2MB TCE table having 512K 4-byte entries.

19. A computer program product in a computer readable medium for providing valid translation entries in a translation control entry table for all supported direct memory addresses, comprising:

first instructions for reserving a page in system memory;

second instructions for writing the reserved page;

third instructions for selecting a region in system memory for the translation control entry table; and

fourth instructions for initializing all entries in the translation control entry table, wherein all entries are initialized to be valid and contain the address of the reserved page.

20. The computer program product of claim 19, further comprising:

fifth instructions for updating an entry in the translation control entry table, wherein a physical memory page replaces the reserved page when the entry is used by an operating system's device driver.

21. The computer program product of claim 20, further comprising:

sixth instructions for restoring the entry in the translation control entry table with the reserved page when the entry is no longer used by an operating system.

22. The computer program product of claim 20, further comprising:

sixth instructions for determining whether a direct memory address translation corresponding to the entry has been cached in a translation lookaside buffer; and

seventh instructions for clearing the direct memory address translation from the translation lookaside buffer in response to a determination that such a direct memory address translation exists.

23. The computer program product of claim 19, wherein the reserved page is inaccessible to an operating system running on the data processing system.
24. The computer program product of claim 19, wherein writing the reserved page includes setting all bytes within the reserved page to 0xFF.
25. The computer program product of claim 19, wherein initializing all entries to be valid includes setting all valid bits to "1".
26. The computer program product of claim 19, wherein the reserved page is a 4KB page.
27. The computer program product of claim 19, wherein the translation control entry table comprises a 2MB TCE table having 512K 4-byte entries.